Staff and patient perceptions of a community urinary catheter service

International Journal of Urological Nursing
THE JOURNAL OF THE BAUN
BAUN BRITISH ASSOCIATION OF UROLOGICAL NURSES

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Journal:	*International Journal of Urological Nursing*
Manuscript ID	IJUN-2019-0410.R1
Manuscript Type:	Practice Development Article
Keywords:	Urinary Catheterisation, Long-term Catheterisation, Community Nursing, Patients' Experience, Quality Improvement, Quality of Life

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Manuscript type: Practice Development - analysis of innovations and trends in practice development in nursing which will impact on urological nursing.

Abstract

Introduction:

Urinary catheters are used extensively throughout healthcare for various reasons including management of urinary tract dysfunction. The purpose of this study was to simultaneously explore both catheter user experience and staff perception of catheter services within community urinary catheter care.

Methods:

A questionnaire was conducted to investigate the views of community nursing staff. During the same time period, patients were interviewed about i) catheter-care standards and adherence to guidelines ii) patients' feelings towards their catheter and iii) potential improvements to catheter practices and design.

Results:

Sixty-nine staff were surveyed. Although 97% of staff indicated they used local guidelines, in up to 62% of cases findings suggested practices in sending urine samples for culture did not comply with guidelines. Seventy-five percent of staff were satisfied with catheter care, but weaknesses were identified in handover processes, communication between staff and patients, and excessive documentation. Staff results were compared with the findings from interviews of 29 long-term urinary catheter users, demonstrating a higher level of satisfaction with catheter care amongst patients (86%). Patients and staff agreed that generally the impacts of their catheter on personal hygiene, sense of independence, sense of dignity and of patient happiness, were neutral (neither positive nor negative). However, regarding improvements to catheter practices and catheter design; 73% of staff but only 45% of patients suggested improvements in service, while 76% of patients but only 49% of staff suggested improvement in design.

Conclusion:

The study reveals general satisfaction with community catheter care, but indicates areas of potential improvements regarding communication, documentation and catheter design. When compared to patient responses, staff overall had a less positive view of patients perception of their relationship with their catheter.

Keywords: Urinary Catheterisation, Long-term Catheterisation, Community Nursing, Patients' Experience, Quality Improvement, Quality of Life

Introduction

Urinary catheters are used extensively throughout healthcare for a range of acute and chronic conditions[1]. Urinary catheters are now recommended only as a method of last resort for managing incontinence, but are still required by 9% of over 65s living in the community and 12% of care home residents[2]. Use of indwelling urinary catheters for over 3 months has a UK population prevalence of 0.14%[3].

Long-term indwelling catheterisation (from minimum of 4 weeks up to lifetime) with a Foley catheter was the focus of this study. Catheterisation is essential for many patients for a variety of reasons such as chronic urinary retention, neurological dysfunction and facilitating continence[4], but is associated with complications such as infection, blockage and leakage, as well as issues with body image and comfort[5]. Catheter-associated urinary tract infections (CAUTIs) are a significant morbidity factor associated with catheterisation, often correlated with the duration of catheterisation[6]. CAUTIs are thought to occur when microorganisms colonize the catheter surface, leading to the growth of biofilms and consequently infection[7]. Indeed, it has been suggested that around 75-80% of hospital acquired urinary tract infections are due to catheters[8], as well being a risk factor for catheter-related bloodstream infections[9]. There is literature to indicate that guidelines are not always implemented adequately for catheter care, particularly regarding overtreatment of asymptomatic bacteriuria in patients with urinary catheters, in addition to poor staff adherence to infection prevention practices during insertion[10,11,12]. More generally, this is also an area of great importance for antimicrobial stewardship and the reduction of device-related infections.

This study focuses on the 'Foley catheter' (the basic design of which dates from 1937[13]), because it is the most commonly used urethral urinary catheter. The Foley catheter consists of a double-lumen tube that is passed through the urethra into the bladder. One lumen allows urine to drain out from the bladder, while the other lumen is used to pass liquid (usually saline) into a balloon that inflates inside the bladder, keeping it in place. In addition to CAUTIs, Foley catheters are prone to a number of issues that significantly impact users' quality of life, including blockage of the catheter tubing lumen or eyelets[14], and subsequent bypassing (leakage of urine around the outside of the catheter), urethral strictures and gross haematuria[15,16]. It is now understood that catheter blockage can be the result of encrustation due to urease-producing bacteria causing urine to crystalise[17,18]. Havard (2014) suggested replacing catheters with artificial urethral sphincters or implants as a solution to these problems[19]; however this is just part of a more general trend to look for alternatives to catheterisation.

This study was instigated by a collaboration between physicists, experts in device design and medical professionals. The multidisciplinary working group was set up to drive research in 1) improving quality of life for those living with a catheter and 2) reducing infection rates through addressing design innovation and service provision. The lack of design innovation of the Foley catheter, despite such extensive global use, is an indicator of the engineering challenge due to the number of factors that need to be considered in design[17(p20)]. One area of design variation in the Foley catheter is coating: all-silicone or hydrogel-coated latex. There is evidence to suggest hydrogel-coated catheters are preferred by patients than all-silicone catheters (70% vs 30% respectively)[20] but the evidence that coatings make a

difference to infection rates is inconclusive[21,22]. New materials which prevent bacterial adhesion and cause minimal host inflammatory response are in development[23,24]. The now widely used closed drainage system design innovation was also an important development in reducing infection rates[25]. Other potential future design improvements include a more discrete design, options for bag-size and neutral catheter colours, as well as changing the catheter shape to make it less vulnerable to infection[26].

In relation to catheter care within the region studied, long-term catheter usage is mainly recommended by Urologists, Urology and Bladder and Bowel Nurse Specialists, District Nurses or General Practitioners, but routine care (such as catheter changes) is carried out by community nurses with supplies coordinated by continence services[27]. NHS staff routinely refer to local and national best practice guidelines including the UK's National Institute for Clinical Excellence Guidelines (NICE). NICE guidelines advise against antibiotic treatment of asymptomatic bacteriuria in catheter users, as well as advising against routine antibiotic prophylaxis when changing catheters in patients with long-term indwelling urinary catheters[28]. NICE recommends that catheters should be changed due to clinical indications such as obstruction, infection, or when the closed system is compromised[29]. Unnecessary catheter use should be avoided to reduce the prevalence of CAUTIs[30].

Very few studies have simultaneously investigated staff and patient perceptions of catheters and catheter care[31]. However, there is growing recognition that understanding the perspective of both patients and healthcare staff is crucial to improving health outcomes[32], user experience and barriers to delivering evidence-

based care. Therefore, our study aimed to simultaneously explore the views of patients and staff about catheter-care standards and adherence to guidelines, patients' feelings towards their catheter and to explore potential improvements to community catheter practices and catheter design.

Methods

The project was reviewed by the Ethics Scientific Officer for South East of Scotland, NHS Research Scotland and approved by local NHS quality improvement team, who confirmed that ethical approval was not required as the project was classified as a quality improvement service evaluation.

Staff Questionnaire

The questionnaire *(appendix 1)* was developed by a multidisciplinary group including an infectious diseases expert, a medical devices development expert, a physicist and a medical student. The survey was created using the Bristol Online Survey tool (BOS)[33] approved by the ehealth security department. The survey was structured to cover: i) adherence to catheter guidelines and catheter care training ii) patients' attitudes towards catheters and staff perceptions of these, and iii) suggestions for future developments in catheter design and catheter care. A paper copy of this survey was also handed out at bladder and bowel nursing staff training days, allowing for additional staff recruitment face-to-face.

Patient Interviews

Interviews were conducted by a single researcher. The responses given during the interviews were recorded then anonymized. The use of an interview allowed participation of patients who might have been excluded if a written questionnaire had been used. Patient interviews were carried out following a defined questionnaire *(appendix 2)*, data was collected and transcribed onto BOS[33]. The interview was structured to cover i) The history of the patient's catheter ii) How patients felt towards

their catheter and catheter services iii) Suggestions for future developments in catheter design and catheter care.

Participants

All community and district nurses in NHS Lothian (N=352) were sent an email link to the online survey in February 2018, which remained available until March 2018 *(Appendix 3)*.

Patients were eligible for inclusion if they had a long-term urinary catheter managed within the NHS Lothian community. Those unable to consent were excluded. Twenty-nine long-term urinary (urethral) catheter users were identified (table 1) by urology specialist staff using a convenience sampling strategy, approached personally and all consented to an interview. Following 29 interviews, data saturation was achieved. Patients were interviewed in healthcare establishments or at home. They received a cover letter approved by NHS Lothian communications with a brief description of the study *(Appendix 4)*. Pseudonyms were assigned to the results to maintain anonymity of the participants.

Data Analysis

Staff questionnaires and patient interviews were structured similarly and had many matching questions, enabling responses to be compared. Surveys and interviews contained a mixture of open and closed questions and Likert scales and each question was followed by a free-text box. Positive and negative phrasing of questions were used to avoid participants answering similarly to every question[34]. Statistical analysis comparing the two population groups was performed using Welch's 2-

sample T-tests. Differences in staff and patient responses were considered significant if the p-value ≤ 0.05. Responses to questions structured as Likert scales were assigned a number between 1 and 5[35], this enabled calculation of mean scores and their standard deviations, and subsequent statistical comparison of staff versus patient responses .

Results

Study Population

Questionnaires were sent to all 352 community nursing staff within the region studied. Sixty-nine (69/354; 19.6%) staff responded, with 61 completing the study via the online survey and a further 8 following recruitment at presentations at staff training days and forums. Staff completed the same questionnaire, regardless of being completed in person or online. The demographics and baseline clinical details of the patient population are demonstrated in Table 1. Seventy-six percent of participants were men. Eighty-two percent of respondents were over age sixty. Patients had varying reasons for catheterisation with the most prevalent being urinary incontinence, urinary retention and neurogenic bladder cause by multiple sclerosis *(table 1)*.

Staff compliance with guidelines

The survey found that staff were changing catheters for appropriate reasons including confirmed clinical signs of CAUTI, breech in infection control, bypassing, blockage, patient pain/discomfort, prior to antibiotic treatment for infection, routine changes or General Practitioner (GP) instructions for removal. 68 of 69 staff (99%) indicated that they would not give antibiotics for asymptomatic bacteriuria, in accordance with NHS Lothian guidelines. Although the guidance states that urine samples should only be sent if patients are clinically unwell, when asked to indicate in a tick box when they would send a urine sample, 28 of 69 staff (41%) indicated they would also send urine if it was cloudy or contained sediment, and 43 of 69 staff (62%) would send samples if the urine was foul smelling. These practices are all

inconsistent with the best practice guidelines and could have led to unnecessary sampling and/or unnecessary antibiotic treatment or catheter changes.

Catheter care

None of the patients surveyed were dissatisfied with their catheter care *(Table 2)*. Sixty-five of 69 staff (94%) stated they had received adequate catheter-care training in the past, although only 47 (68%) felt that there was good availability of staff re-training. Health Protection Scotland and the best practice guidelines recommends regular reviewing of the need for an indwelling urinary catheter and removal of the catheter if possible.[36] However 22 of 29 patients (76%) interviewed were unaware of medical staff having ever reviewed their need for catheterisation. Forty-six of 69 staff (67%) indicated that they would like to see the need for catheters being reviewed more often, with 34 (49%) feeling that their workload prevented them from reviewing the need for catheters as often as they wished. Only 29 of 69 staff (42%) felt that their patients always had a documented plan for the duration of catheterisation and only 11 staff (16%) felt catheter removal plans were always clear and effective.

Communication and documentation

Staff expressed frustration with excessive documentation: in particular, repetition of catheter-related information in multiple places. While 59 of the 69 staff (86%) felt that catheter handover documentation is passed efficiently between healthcare professionals within the community, and 43 staff (62%) felt the handover is efficient from community to hospital, only 15 staff (22%) stated that handover documentation was passed efficiently from hospital to community. The national NHS documentation system - the “urinary catheter passport”[37] - was referred to often in the free text

boxes as a system that could be utilised more effectively, although the survey did not directly ask about this. Our survey results also suggest that staff-patient communication could be improved since differences were found in staff and patient perceptions of patient knowledge and expertise.

Education

Twenty-three of 29 patients (79%) said they were confident or very confident in looking after their catheter, while, in contrast, 32 of 69 staff (46%) felt that patients are insufficiently educated regarding their catheter. There was also a difference between staff and patient perceptions of whether catheter-users understood their need for catheterisation (p-value<0.001): 90% of patients felt that they did, while staff did not agree as strongly, with only 54% feeling that patients were well informed about this *(fig.1)*. This result may indicate weakness in patient education as well as somewhat negative staff perceptions of patient awareness around catheter usage. It may also indicate differences in what staff and patients think is important to know about catheter management.

Infection

Prevention of CAUTIs is a major driver in attempts to reduce catheter use[8,38]. Indeed, nineteen (67%) patients interviewed had developed at least one urinary tract infection (UTI) since having a catheter. CAUTIs were a regular issue faced by staff, with only 4 staff (6%) responding that they 'rarely' found catheters caused UTIs.

Impact of catheters on quality of life

Patients' attitude to their catheter tended to reflect the nature of the health condition causing their need for catheterisation. Those with multiple sclerosis were generally happier, reporting that the catheter gave them freedom and independence. In contrast, ambulant patients with a catheter eg. for urinary retention, reported that they were less satisfied, stating they found catheters restrictive. The variation of reasons for catheterisation can make it difficult to generalise catheter users and whether catheterisation negatively or positively impacts their quality of life. In keeping with this observation, staff commented throughout the project on the difficulty of generalising catheter-users, leading many of them to answer 'neutral' to questions such as whether users were happy to have a catheter (48%; 33/69 neutral answers) and if catheters had a negative impact on sense of independence (51%; 35/69 neutral answers). On these two questions there was no significant difference between staff and patient responses (p-value = 0.39 for both questions)

The survey did find significant differences between staff and patient responses regarding complaints (p-value <0.001). Ninety percent (26/29) of patients disagreed with the suggestion that they complained about their catheter, while staff responses were divided as to how often patients complained, with roughly equal numbers of staff feeling that patients did or did not complain *(fig. 1).* The survey found no significant difference between staff and patient responses regarding the impact of catheters on users' personal hygiene, independence or sleep *(fig 1*, p-values 0.25, 0.39, 0.14 respectively*)*. Thirty-one percent (9/29) of patients felt catheters negatively impacted their personal hygiene, including two female patients who felt that urethral catheters particularly affected personal hygiene during menstruation, and indicated a wish for suprapubic catheters for long-term catheterisation. With regard to

independence, patient opinions varied greatly: 31% (9/29) of patients felt their catheter reduced their sense of independence, while 21% (6/29) answered neutrally and 48% (14/29) felt it increased their independence (*fig 1*). In addition, 76% (22/29) of catheter patients found that their catheter positively impacted their own (and often their partner's) sleep because the catheter removed the inconvenience of urinating frequently at night *(fig. 1)*. Some patients reported that catheters occasionally became displaced or the night bag required emptying, but these problems were strongly outweighed by the satisfaction of a good night's sleep. A small proportion of users felt that the catheter tubing strongly disturbed their sleep, particularly when changing position.

Problems with catheters

We found that staff were most concerned about bypassing and blockages while patients reported infection as a more common issue: 66% (19/29) of patients but only 9% (6/69) of staff wrote infection as a major issue in the free-text box *(Table 3).* Staff and patients found comfort to be an issue to an equal degree (28% vs 31% respectively). Patients complained of embarrassment (28%; 8/29) and bleeding (38%; 11/29), while staff did not report either of these as an issue.

Suggestions for innovation

Our questionnaire included an open-ended question in which staff and patients were invited to make suggestions for improvements in catheter services and catheter design. To analyse these open-ended questionnaire responses, they were categorised into themes *(appendices 4-7)*.

Catheter services

The survey found significant difference (p=0.02) between staff and patient perceptions of whether catheter services could be improved *(appendix 5 & 6)*: 50 staff (73%) but only 13 patients (45%) felt that improvements were needed. The staff responses suggested improvements to current services to relieve pressures on district nurses. Twelve staff (17%) suggested that specialist continence nurses should have more contact with community patients and 7 suggested introducing a clinic for catheter-users who are independent. Staff complained of the volume of repetitive catheter-related paperwork and suggested making documentation more concise could improve efficiency, as well as improving communication within catheter services, particularly between hospital and community. The majority of patients were complimentary towards catheter services, particularly towards the district nurses. Most suggestions from patients concerned improving patient-staff communication and the education and awareness of patients, staff and the general public education about catheters.

Catheter design

Interestingly, there was significant difference of opinion between staff and patients regarding the need for improvements to catheter design (p=0.01) *(appendix 7 & 8)*: 22 of 29 patients (76%) felt that catheter design could be improved, compared to only 34 of 69 staff (49%). Staff and patients were given the option to comment on both catheter design and catheter services in free-text boxes, but not every participant provided a written response. The theme containing the most responses from staff (19/47 written responses) was unenthusiastic remarks; including Ms X: “We are not designers, catheters do what they are made to do” and Ms Y: “if there could (be a

design improvement) there would?". Indeed, many staff responses simply stated problems with current catheter designs rather than offering ideas. However, some suggestions for catheter design innovation were made by the staff, the most popular of which (13/47 responses) related to design changes to reduce blockages and bypassing, such as increasing the eyelet size at the catheter tip to prevent easy blockages from debris. In contrast to the somewhat unenthusiastic staff responses, many patients wished for change in catheter design and proposed diverse ideas. These included multiple smaller catheter bags instead of one large bag to improve the discreteness of the collection bag allowing patients to wear tighter fitting trousers; creating a tug-proof catheter for Alzheimer's; and a device to hold the catheter bag open at night time to prevent bypassing due to pressure on the collection bag during sleep. Suggestions were also made for tubing to be attached to the user's thigh rather than calf to minimise disruption when changing sleeping positions.

Discussion

In this work, we surveyed 69 NHS Lothian community nursing staff (district nurses) and 29 long-term catheter users regarding catheter-care standards and adherence to guidelines, patients' feelings towards their catheter and potential improvements to catheter practices and design. Our study revealed general satisfaction with catheter services among patients and staff, and generally agreement between staff and patients, although staff overall had a less positive view of patients' perception of their relationship with their catheter. We identified disagreement regarding patient complaints of their catheter and the principal problems that catheters caused. Contrasting perspectives on future catheter design were obtained.

Concerning adherence to guidelines in community catheter care, our study identified areas for improvement. The first of these concerned, when to send urine samples: some staff were found to be sending unnecessary samples, contrary to guidelines. This finding is consistent with Trautner et al. (2014) in America, who found that only 42% of staff surveyed achieved greater than minimal recall of asymptomatic bacteriuria guidelines. Furthermore, Traunter et al found that correct management of catheter-associated bacteriuria according to evidence-based guidelines is increased with staff experience[39]. While the degree of staff experience was not recorded in our survey, our results do suggest that staff re-training may be needed to ensure correct practices are being carried out to minimise device-related infections[11]. Reducing unnecessary cultures and associated unnecessary antimicrobial use could improve antimicrobial stewardship[10].

While Health Protection Scotland recommends regular reviewing of the need for an indwelling urinary catheter and removal of the catheter if possible[36], 76% of patients were unaware of medical staff having ever reviewed their need for catheterisation and 67% of nursing staff wanted to see the need for catheterisation being reviewed more often. Perhaps future service development should empower and educate nursing staff to take more responsibility for reviewing the need for catheterisation. including referral for specialist opinion if they feel that there has been a change to the medical situation, or that the patient may be suitable to be taught intermittent self-catheterisation.

Our study also found a need for improved communication in the handover process from hospital to community, for better staff-patient communication and for reduction of excessive documentation. Jaeger et al. (2017) also found that following 8 weeks discharge from NHS hospitals, many patients lacked adequate information for proper catheter self-care[40]. Improving the efficiency of the handover from hospital into community care could have a positive impact on catheter services. Improving communication and discussions around catheterisation appropriateness can aid CAUTI prevention[30]. Some deficiencies in staff-patient communication were evident in our survey, for example in the fact that 28% of patients complained of embarrassment and 38% of bleeding, while staff did not report either of these as an issue. Staff and patients also disagreed over whether catheter-users know the reason for their catheterisation. This suggests that either patients may have misconceptions of their need, or staff are not communicating enough with patients. Previous work has highlighted that the reason for catherisation is often poorly recorded by the inserting clinician[41]. Staff commented in the free-text box that the

'Patient Urinary Catheter Passport' was often not carried by patients, negating its usefulness for communication between patients and staff. Computerising all catheter-related documentation in future may be a solution to improve the efficiency of documentation, allowing staff to spend more time educating and communicating with patients.

Patient and staff responses differed regarding improvements to catheter design. Seventy-six percent (22/29) of patients indicated an enthusiasm for design changes and technological advancements for urinary incontinence. Indeed previous work has suggested that even simple changes such as improving the colour of tubing and size of catheter-bag could make user experience more positive[26]. It is hoped that these patient suggestions made in our survey, which were informed by their experience of long-term catheter usage, can be helpful in directing future design innovation.

Our study identified blockages, bypassing and embarrassment as common problems with catheters. This is consistent with the work of Mackay et al. (2018) who identified blockages and bypassing as key issues in community catheter care[42]. Darbyshire et al. (2016) used similar methods to this study to survey 50 hospital in-patients about their catheter experience and also discovered that, while many patients found the catheter to be useful, users found the catheter painful and embarrassing, with many experiencing leaking and blocking[43]. These findings mirrored those of Prinjha and Chapple (2013) who interviewed 36 long-term catheter users and identified similar common problems, as well as a negative impact on body image[44]. Users in that study also highlighted the lack of innovation in catheter design, hoping for a new design that was more discrete, would promote independence and reduce complications,

similar to the findings of our study. Another potential impact on quality of life is the impact of catheters/incontinence on sexual relationships[45,46] however this was beyond the scope of our study. This topic could be addressed in future work comparing patient and staff perceptions of catheters, since current literature shows that healthcare professionals are not proactive in discussing sexuality with patients who suffer from incontinence[16,47]. A patient's body image and desire for an intimate relationship is another topic, not addressed here, that may need to be discussed more openly by clinicians involved in the care of long-term catheter users, as it may significantly change patient experience and potentially quality of life.

Our study identified potential weakness in the education of long-term catheter users on catheter self-care, with forty-six percent (32/69) of staff indicating they felt patients are insufficiently educated on their catheter. As well as, difference between staff and patient perceptions of whether catheter-users understood their need for catheterisation *(fig.1)*. Ensuring that patients play an active role in their catheter management could make a significant difference to patient acceptance and tolerance. Kralik et al (2007) identified high quality patient education on urinary catheter self-care as fundamental to impacting patient experience and can increase catheter users' sense of control of their condition[45].

A major strength of our study was the simultaneous collation of information from both staff and patients to allow for comparison – something that has only rarely been attempted in previous work[31,32,48]. This approach is valuable as it collates data from all the individuals most involved in the community catheter service and allows identification of statistically significant differences between patient and staff

perceptions. Our survey has also led to suggestions for the direction of future catheter design and catheter services. Differences in staff and patient response may be due to the participation bias of the patients identified for the study, whereas the staff had to comment on a wider range of patients that they had cared for. This could increase the differences between responses from the two groups.

There is growing recognition that understanding the perspective of both patients and healthcare staff is crucial to improving health outcomes[32]. An early investigation of catheter user experience (1987) suggested that the key to patient understanding and acceptance of their catheter may be patient education and management[49]. Further research indicates that in order to improve the experience of catheter users, healthcare professionals must recognise user's individual needs and concerns, rather than just the clinical functioning of the device[48]. Godfrey (2008) found that the quality of interactions with healthcare professionals, friends and family also influenced elderly patients' relationship with their long-term catheter. Godfrey also highlighted the need for healthcare professionals involved in community catheter care to be aware of and sensitive to patients' individual situations and needs rather exclusively focusing on the catheter's function[48]. Staff attitude was found to have significant impact on the care received by catheter users, thus it is important that staff and patient views towards catheters are alligned[50].

Although the response rate to our survey was only 20% of all eligible staff (69/352), possibly due to workload and time pressures, a relatively large sample size was achieved for a service evaluation study of this nature. The study was however limited by responder bias and the number of patient participants, who came from a similar

socioeconomic group *(table 1).* The patient group were catheterised for a variety of reasons resulting in variation in how long-term catheterisation impacted quality of life; making it difficult to generalise the impact of catheterisation on catheter users. More studies are required to fully characterise catheter-users' needs and problems.

Understanding these needs and problems could reduce stigma surrounding urinary issues[24] and better inform clinicians who care for patients with indwelling catheters. This will form the future work of our multi-disciplinary group. A follow up project would be a longitudinal study which would allow observations and data to be collected over a time to watch how perceptions of community catheter services change over time since catheter insertion. A wider range of catheter users should also be aimed for in future studies. A more diverse patient population would reduce selection bias, as well as allowing the investigation of how factors such as age and being ambulatory vs. bed-bound affects catheter users' experience. Taking a broader perspective, an interdisciplinary approach, including social scientists, designers, engineers, medical staff and catheter-users themselves, may be needed to achieve optimal solutions for urinary catheter health.

Conclusion

This study of community urinary catheter care adds to the limited research that has been published regarding patient perspectives of having an indwelling urinary catheter, and staff awareness of patient perspectives. The findings are generally positive, although some areas of potential improvement are identified in the handover process from hospital to community, patient-staff communication and excessive

documentation. Our study also revealed patient and staff suggestions for improvements in catheter design and practice.

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Acknowledgements:

The authors thank NHS Lothian Community Nurses, particularly Kathryn Janssens, Fiona Tynan Anne Sanderson, Lynne Pryde, Pat Wynne and Catriona Drummond for their assistance with the study, and acknowledge assistance from Mary McLeod in the Nurse Urology Unit at the Western General Hospital. EY was supported by an EPSRC DTA studentship; RJA was supported by the European Research Council under consolidator grant 682237 EVOSTRUC. MRP was supported by an Institutional Strategic Support Fund from University of Edinburgh.

Footnotes

Contributors: FD conceived the study. FD, MP and RA designed the search strategy. FO conducted collection of data. FO drafted the full manuscript, and all authors reviewed and approved final submission.

Funding: This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests**:** None declared.

Patient consent**:** This study was approved by a local quality improvement board. Information was provided to both patients and staff, and patient consent was obtained prior to interviewing.

	Patient participants N=29 (%)
Age at interview (Years)	
Under 60s	5 (17)
Over 60s	24 (83)
Gender	
Male	22 (76)
Female	7 (24)
Ethnicity	
White British	29(100)
Education	
No qualifications	10 (35)
2nd ary qualifications or greater	19 (66)
Reason for catheterisation	
Multiple Sclerosis	7 (24)
Urinary incontinence	7 (24)
Urinary retention	6 (21)
Prostate enlargement	4 (14)
Spinal Injury	3 (10)
Surgery on the urinary tract	2 (7)

Table 1: Socio-demographic characteristics of patient participants (n = 29).

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Patient responses. N= 29 (%)				
I am satisfied with my catheter care.				
8 (28)	*13 (45)*	*3 (10)*	*5 (17)*	*0 (0)*
I am confident looking after my catheter.				
11 (38)	*12 (41)*	*5 (17)*	*1 (3)*	*0 (0)*
Staff responses. N = 69 (%)				
I feel there is good availability of catheter care retraining for staff.				
6 (9)	*41 (59)*	*11 (16)*	*10 (15)*	*1 (1)*
I would like to see catheters being reviewed more often than they currently are.				
20 (29)	*26 (38)*	*18 (26)*	*4 (6)*	*1 (1)*
I feel I have had adequate catheter care training in the past.				
27 (39)	*38 (55)*	*0 (0)*	*(3 (4)*	*1 (1)*
I think patients are educated enough regarding the care of their catheter.				
1 (1)	*18 (26)*	*18(26)*	*25 (36)*	*7 (10)*
My workload prevents me from reviewing catheters as often as I'd like to.				
9 (13)	*25 (36)*	*13 (19)*	*17 (25)*	*5 (7)*
It is easy to contact specialists regarding catheter-associated problems in complex cases.				
12 (17)	*31 (45)*	*16 (23)*	*8 (12)*	*2 (3)*

Table 2: Patient and staff responses to questions about catheter services. The questions within table 3 were paraphrased for clarity of presentation of data. The full questionnaire is in supplementary data.

Issue with catheters	*Patients n=29 (%)*	*Staff n=69 (%)*
Blockages	10 (34)	48 (70)
Bypassing	24 (83)	49 (71)
Infection	19 (66)	6 (9)
Embarrassment	8 (28)	-
Bleeding	11 (38)	-
Bag bursting	6 (21)	-
Other comfort issues	9 (31)	19 (28)
Other practical issues	4 (14)	3 (4)

Table 3: Staff and patients perception of main practical issues with catheters.

Figure legends.

Figure 1: Staff and patient perceptions of how catheters affect certain social and behavioural factors.

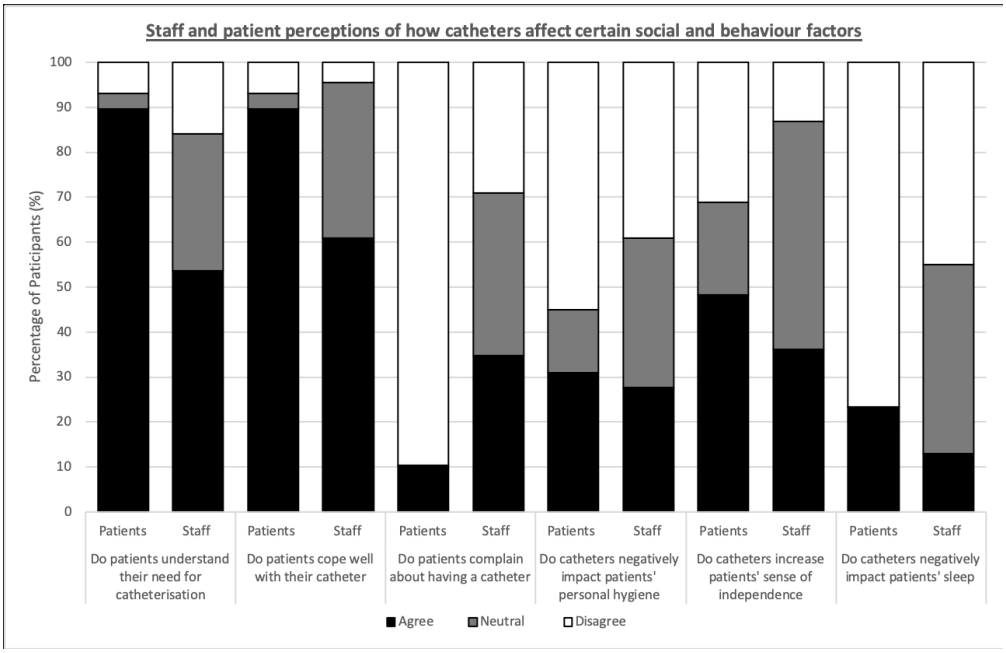

Figure 1: Staff and patient perceptions of how catheters affect certain social and behavioural factors.

217x140mm (150 x 150 DPI)

Appendix 1

Questionnaire for Staff

I am a medical student doing a project focused on evaluating catheter usage and guidelines within community care. I would be grateful if you could please fill out this questionnaire.

Section 1:

1. What is your job title?

2. **How often do you find that catheters cause UTIs?**

Never Rarely Occasionally Often Every time a catheter is used

Any further comments….

3. **What are the main issues you find with catheters?**

4. **What guidelines do you refer to for catheter care?**

NICE SIGN NHS Lothian Local Guidelines Other None of the above

Any further comments….

5. **Current catheter services meet NHS Lothian guidelines.**

Strongly disagree Disagree Neutral Agree Strongly Agree Unable to comment

Any further comments….

6. **I have had adequate catheter care training in the past.**

Strongly disagree Disagree Neutral Agree Strongly Agree Unable to comment

Any further comments……

Strongly disagree Disagree Neutral Agree Strongly Agree Unable to comment

7. **I feel there is good availability of catheter care retraining for staff.**

Any further comments……

Very Difficult Difficult Neutral Easy Very Easy

8. **How easy is it to contact specialists regarding catheters-associated problems in complex cases?**

Any further comments……

Never Rarely Occasionally Often Always

9. **How often do you know the reason(s) why your patient(s) needs a catheter in situ?**

Any further comments….

10. **How often do your patients have a documented plan for duration of cathetersation?**

Never Rarely Occasionally Often Always

Any further comments…

11. **If a catheter removal plan is in place, do you feel the plan is always clear & effective?**

Never Rarely Occasionally Often Always

Any further comments

12. **I would like to see catheters being reviewed more often than they currently are.**

Strongly disagree Disagree Neutral Agree Strongly Agree Unable to comment

Any further comments

13. **Do you feel there is efficient catheter handover documentation passed between healthcare professionals from Hospital to community**

Yes No

Any further comments

14. **Do you feel there is efficient catheter handover documentation passed between healthcare professionals from community to community**

Yes No

Any further comments

15. **Do you feel there is efficient catheter handover documentation passed between healthcare professionals from community to hospital.**

Yes No

Any further comments

16. **I think that patients are educated enough regarding the care of their catheter.**

Strongly disagree Disagree Neutral Agree Strongly Agree Unable to comment

Any further comments

17. **Do you feel confident in the management of Catheter-associated urinary tract infections?**

Any further comments

Very unconfident Unconfident Neutral Confident Very confident

18. Which of the following options would stimulate you to send a urine sample for investigation? (You may tick multiple boxes).

When urine is cloudy ☐

When urine has Increased levels of sediment ☐

When urine smells ☐

When patient has confusion ☐

When patient has a fever ☐

When patient is in discomfort ☐

Other, please give details ☐

19. When would you treat a patient with an antibiotic?

Asymptomatic bacteriuria ☐

Symptomatic bacteriuria ☐

20. What would stimulate you to change a patient's catheter?

☐

21. My workload prevents me from reviewing patients' catheters as often as I'd like to.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

☐

Section 2:

22. In general are your patients happy or unhappy with their catheters?

Happy Unhappy

Please give reasoning for your answer to the above question?

23. Catheters negatively impact patients' personal hygiene.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

24. Catheters increase patients' sense of independence.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

25. Catheters reduce patients' sense of dignity.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

26. Catheters have a negative impact on patients' sleep.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

27. My patients cope well with their catheter.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

28. My patients know why they need a catheter.

Any further comments….

Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

29. My patients are happy to have their catheter.

Any further comments….

Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

30. Patients complain about having a catheter.

Any further comments….

Section 3:

31. **Do you think there could be improvements made to catheter services?**

Yes | No

If the answer was yes, please give details.

32. **Do you think there could be improvements made to catheter design?**

Yes | No

If the answer was yes, please give details.

33. **Is there anything else you would like to add regarding catheters and catheter care within the community?**

Thank you very much for taking the time to complete this survey, it is greatly appreciated. If you are happy to be contacted for further questioning for this project please leave your contact details below:

Appendix 2

Patient Questionnaire

I am a medical student doing a project focused on patients' thoughts and feelings towards having a catheter. The first section is about your catheter history, the second part is about your feelings towards your catheter and final section is about the future of catheters. I would be very grateful if you could please fill out this questionnaire.

SECTION ONE – THE HISTORY OF YOUR CATHETER

Where appropriate, please circle your chosen response.

1. **Do you have a short-term or long-term catheter?**

   Short-term Long-term

2. **How long have you had your catheter for? (days/weeks/months)**

3. **Why did you have a catheter put in?**

   Urinary incontinence ☐

   Urinary retention ☐

   Surgery on the urinary tract ☐

   Multiple Sclerosis ☐

   Spinal cord injury ☐

   Unsure ☐

   Other, please give details

4. **How often do medical staff review your catheter? (This does not include changing the catheter bag)**

   Weekly Monthly Every 3 months Other Unsure

   If you answered 'other', please give details…

5. **How often is your catheter changed?**

   Weekly Monthly Every 3 months Other Unsure

If you answered 'other', please give details…

6. How do you find the process of changing your catheter?

Very Uncomfortable Uncomfortable Neutral Comfortable Very Comfortable

Any further comments

7. Would you like your catheter to be changed more often than it already is?

Yes No

Please give reasoning for your answer above.

8. How satisfied are you in current NHS catheter care?

Deeply dissatisfied Dissatisfied Neutral Satisfied Very satisfied

Any further comments

9. How satisfied are you with the information you have been given regarding your catheter?

Deeply dissatisfied Dissatisfied Neutral Satisfied Very satisfied

Any further comments…

10. Where did you receive the information you know regarding catheters?

Written (eg. leaflets/posters) ☐

Websites ☐

Apps ☐

Verbally (from Nurses) ☐

Verbally (from Doctors) ☐

From friends and family ☐

From self-help groups ☐

If Other, please specify ☐

11. How confident are you with looking after your catheter?

Very unconfident Unconfident Neutral Confident Very confident

Any further comments ☐

12. If your catheter is long term, have you had any problems with your catheter?

Yes ☐ No ☐

If the answer to the question above was yes, please detail what the problem was:

Infection ☐

Bypassing ☐

Pain ☐

Bleeding ☐

Bag Bursting ☐

Embarrassment ☐

Other, please give details ☐

13. Since having a catheter, how many times have you had a urinary tract infection?

Never Once Twice Three times Four times Five times Greater than five Unsure

Any further comments……

14. How many times have you received antibiotics for a urinary tract infection.

Never Once Twice Three times Four times Five times Greater than five Unsure

Any further comments……

15. Have you ever had to be admitted to hospital for a urinary tract infection?

Never Once Twice Three times Four times Five times Greater than five Unsure

Any further comments……

SECTION TWO - THIS SECTION IS ABOUT HOW YOU FEEL ABOUT YOUR CATHETER, THERE ARE NO RIGHT OR WRONG ANSWERS.

Where appropriate, please circle your chosen response

16. Are you happy or unhappy with your catheter?

Happy | Neutral | Unhappy

If the answer was unhappy, what are the reasons?

17. My catheter has negatively impacted my personal hygiene.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments

18. My catheter increases my sense of independence.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments

19. My catheter reduces my sense of dignity

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments

20. My catheter has a negative impact on my sleep.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments

21. I cope well with my catheter.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

22. I know why I have a catheter.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

23. I am happy to have my catheter.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

24. I complain about having a catheter.

Strongly disagree Disagree Neutral Agree Strongly Agree

Any further comments….

25. Do you think anything about catheter design needs changing?

Yes No No comment

If the answer was yes, please give details.

26. If you had to tell your friends what catheters are like, what would you say?

SECTION THREE - THE FUTURE OF CATHETERS

Where appropriate, please circle your chosen response

27. Do you think there could be improvements made to catheter services?

Yes	No	No comment

If the answer was yes, please give details.

28. Do you think there could be improvements made to catheter design?

Yes	No	No comment

If the answer was yes, please give details.

29. Is there anything else you would like to add regarding catheters and catheter care?

30. The following question is optional. All personal information will be strictly anonymised. If you are happy to provide the following information, please complete this final question.

Age Range	<18	18-40	40-60	60+

Education level	No school qualifications	Secondary/high school	Vocational	University	other

Ethnicity	White	Mixed heritage	Asian or Asian British	Black or Black British	Chinese or other ethnic group

Gender	Female	Male	Other

Thank you very much for taking the time to complete this survey, it is greatly appreciated.

Appendix 3

27th February 2018

Catheter Services Survey

To whom it may concern,

I am a medical student doing a project focused on patient and staff satisfaction of catheter services within the community.

The main aims of the project:

- To analyse catheter care community guidelines and conduct a search through literature to investigate principal patient concerns towards catheters.
- To survey community staff and interview patients to identify issues with current catheter care and usage in the community.

I would like to gather information regarding community staff members' thoughts and feelings towards current catheter care. To do this I would like to ask you to fill out a survey which is split into 3 parts:

1. Catheter guidelines and catheter care training
2. Community staff perception of patients attitudes towards catheters
3. Suggestions for future of catheters and catheter research

I really appreciate you taking the time to fill out the survey. Hopefully the project will produce findings that may be used to steer catheter services and future research in a more informed and useful direction.

Thank you.

(Name of student)
3rd Year Medical Student,
University of Edinburgh

Appendix 4

26th February 2018

Catheter Services Survey

To whom it may concern,

I am a medical student doing a project focused on patient and staff satisfaction of catheter services within the community.

I would like to gather information regarding patient thoughts and feelings towards having a catheter, as well as your opinion on current catheter care. To do this I would like to ask you some questions, taking around 20-30 minutes of your time. All information will be anonymised and is kept strictly confidential.

It is hoped that the project results will have a positive impact on the development of catheters and catheter services in the community. Your help is greatly appreciated.

Thank you.

(Name of student)
3rd Year Medical Student,
University of Edinburgh

Appendix 5

Staff suggestions for improvements to catheter services

Changes to current services	Introduction of new service	Education	Information	Catheter review - patient centred information	Communication	Documentation	Training and retraining	Continuence products	Statements supporting the current services	Other
1) "easy access to urologists when we have problems, we have to go via GP, nurse led clinic often too busy to help"	1) "Having a catheter clinic for patients who get out with help our workload as many of our patients can get out (we only see housebound patients otherwise. Faster	1) "More awareness about catheter passports"	1) "One place for all information regarding	1) "Reduce the number of patients with indwelling catheters.Clarity on the reasons why people have catheters".	1) "More communication from the hospitals would be fantastic - better handover"	1) "Too many items of paper work that repeat one another"	1) "Need more refresher training	1) "It would be great if their was	1) "It gets reviewed every 12 weeks, or of patient has a	1) "There have been no changes to catheters
2) "Patients who have a catheter for new urinary retention are told they will have a TWOC in 2 weeks time. They usually have to wait several weeks before the have a TWOC"	referrals to urology for patients with complicated catheters. More reviews for catheter patients."	2) (where catheter is inserted) more education"	catheters and clear guidance on uti"	2) "more updates"	2) "more communication between professional services"	2) "The introduction of catheter 'passports' for all patients with catheter"	courses because after of the initial catheterisati on training there isn't much re-education."	better use of comfisure straps and sleeves for link with patients to promote continence care department in community"	problem they call the nurses"	since first invented."
3) "It would be useful if people were discharged with a spare catheter when newly catheterised."	2) "Independent individuals ought to have a clinic to attend, rather than rely on District nursing services. Also highlight	3) "Ensuring education and understanding of equipment as soon as	2) "understanding of maintaining a catheter,	just the way it is and people are reluctant to do a TWOC. We	3) "communication between healthcare	3) "There is lots of repetition of		comfort."	2) "reasonable of catheter	2) "The use of catheter
4) "I think there should be a separate continence specialist nursing team to attend to all continence problems and visit patients at home - I don't feel DNs have enough time to spend managing these patients ie catheters, patients needing pads and continence assessments."	importance of avoiding catheters, particularly for incontinence during acute admission."	inserted"	more information to	need more information on how long each patient should have their catheter. Or a plan"	professionals"	catheter				valves should be promoted
5) "more specialist nurses directly involved with patients."	3) "Currently non-housebound patients have to have their catheters changed by DN team at home in the community. If	4) "more education at the outset re catheter maintenance"	health services and patients"	4) "catheter reasoning should be easier to find and reviewed	4) "Communication between hospital and community needs to	documentation ie. DN notes, passports and CAUTI bundle. Could be more				instead of leg bags"
6) "continence nurse involvement in other methods of urinary continence i.e ISC pads, uro sheaths etc"	4) "For those independent non house bound patients, a clinic where they can	5) "more support and education given to patients and families with newly inserted		5) "People with long term catheters could be reviewed	improve" 5) "communication between hospital and	efficient." 4) "Catheter passports should be filled in by ward."				
7) "clinics for catheter changes would be good"	attend for catheter changes would be helpful. They would be able to arrange	catheters prior to hospital discharge"		more often for TWOCs"	community" 6) "better communication between care settings."					
8) "easier to order"	their own appts at suitable times."			6) "Reason for catheter given and if its a long term solution"	7) "Better communication between patient,					
9) "Problems which need to be checked by urology seem to take a long time"	5) "non-housebound patients get frustrated that they cannot make an			7) "patients are often discharged with catheters and	community services and service which initially					5) "Mostly works"
10) "Patients have catheters inserted & wait too long for TWOC, resulting often in long term catheters"	appointment and have to wait in for the community nurses to come. They would			have no understanding of what it is for/why they have it and	inserted catheter" 8) "difficulty contacting					
11) "Easier access to advice"	prefer to be able to make an appointment with the practice nurse"			the issues that can be associated with it before they are handed	continence service both patients and community					
12) "TWOCS should be done asap if this is a plan for the pt.(I don't understand why some people have to wait 2 - 3 weeks for NLU appt).TURPs should be done asap or catheter valves considered early on if pt is on waiting list for TURP (to prevent problems with incontinence post op.) Wards should not catheterise people for staff convenience. They should think more about making access to toilet etc ...."	6) "Patients should have access to service to have their catheter changed if they are independent enough to attend a clinic"			over to a community district nursing team. It can therefore take weeks, or even months of support visits and social care referrals for catheter care when the patient is otherwise independent with other ADLs."	staff" 9) "more collaboration between community services and urology" 10) "Better discharge information from hospital very much needed, Community nurses spend ages trying to find pertinent information"					
	7) "catheter clinics for non housebound patients"			8) "Need to reduce inappropriate catheterisation"						

Appendix 6

Patient suggestions for improvements to catheter services:

Positive remarks	Educational issues	Communication/ information issues	Additional services
1) "The District nurses are particularly wonderful." 2) "The NHS is already under so many financial pressures. The district nurses give great service day and night (even had a DN show up at 11.45pm on New years eve) " 3) "No complaints." 4) "The services are very good" 5) "Very very good, excellent service" 6) "Very good. If they were on trip advisor, I'd give Nurse Urology a 5 star' 7) "The service is ideal." 8) "District nurses are very good. They are very prompt and I have no complaints."	1) "There could be more training for partners of catheter users regarding changing the catheter bags to prevent nurses having to come out during the night to resolve issues. Training for partners focused on coping with bypassing would also be appreciated." 2)" More education to patients regarding catheters and catheter care. More support at the start, i.e. if a nurse could make a few home visits and sit and explain everything based on your personal situation. The DN are stretched enough as it is.Could have a mentoring scheme ie. an easy point of contact with someone else with a catheter/a staff member. A catheter call helpline." 3) "More education for patients regarding catheters"	1) "Sometimes I feel ignored, for example I am often troubled by the sensation of needing to urinate but other than once receiving a numbing gel for my penis, I have not had any real help to relieve this sensation. I feels like concerns are ignored. The Urology ward is too busy and I had to wait far too long for nurses to respond to his buzzer." 2) "The staff in the Urology department at the Western General Urology department could be more informative about the catheter and how to manage it, particularly providing more information for partners." 3) "Would like much more consultation and discussion. Particularly with regards to the option of a suprapubic catheter." 4) "Give more information when initially inserting catheter." 5) "More information given to catheter users. i feel very out of the loop in terms of my catheter care."	1) "Would be good if there was a drop in clinic with a doctor for when a problem arises with catheter ie. unexpected bleeding."
9) "The nurses are first class and always explain things well." 10) "The nurses and staff are all very good." 11) "The district nurses are really good." 12) "The district nurses are very good." 13) "Can't complain. The continence care service are very accommodating. The district nurses are fabulous"	4) "More public education regarding catheters to prevent the embarrassment of catheter users. I would like the public to accept people with disabilities more." 5) "Feels that district nurses could have more education regarding types of catheters to make catheter changes more pleasant."	6) "Initially could have had more information when catheter was inserted." 7) "Seems to be a lack of general information and what you do find out is a bit of a lottery based on who you speak to. Should be some sort of collation of information that is given to catheter users rather than leaving it down to luck and chance of what one healthcare professional may tell you compared to another. Would like more information about bags and lengths and who to contact is certain situations. This would take away the element of change and give certainty and facts... possibly an opt-in support group for catheter users. Felt as though there was no aftercare following the suprapubic operation."	

Appendix 7

Staff suggestions for catheter design innovations:

Reduce blockages and bypassing	Leg bag	Tubing	Discrete	Comfort	Impertinent/ unenthusiastic remark about new catheter design	Other
1) "a more robust design to reduce blockages . Increase inlet size?"	1) "Leg bag attachments are clunky"	1) " Perhaps longer lengths for morbidly obese patients, although main issues tend to relate to catheters expelling, perhaps most likely due to pressure of abdomen onto bladder as opposed to catheter being pulled."	1) "Less 'medical looking' - lots of options/ choice available for stoma bags etc, but not catheters, particularly for younger patients."	1) "SP catheters often cause discomfort on removal due to design of catheter"	1) "Not too sure what there could be at this point"	1) "but silver coated catheters are requested from hospital for some patients who have recurrent AKI"
2) "A Ddesign where it was less easy to block would be good"	2) "Better fixation to legs."	2) "Possibly, the tubing can sometimes interfere or become displaced and cause skin indentations or sores"	2) "More discrete bags. "	2) "Finds that all silicone catheters are disliked by patients. Too rigid and not flexible enough."	2) "We are not designers, catheters do what they are made to do"	2) "a coating of something to help prevent UTIs? not sure what or if possible!"
3) "catheter tips often degrade/ block with exudate and sediment"	3) "better attachment design of catheter and leg bag for comfort and to prevent kinking"	3) "Supra pubic catheter could be different lengths"		3) "pre lubricated"	3) "Not entirely sure what changes could be made"	3) "Difficult to instill saline during catheter change as one hand is holding the catheter in place and two hands are required for instilling the solution. Tips could be colour coded to help when changing leg bags or applying night bags"
4) "eyelets at tip of catheter could be bigger to allow smaller particles of debris to pass down the catheter. this would maybe alleviate some of the problems with blocking and bypassing.I have not found that the open ended catheters are much better"				4) "Balloon on silicone catheters causes ridges on deflation of balloon sometimes causing trauma on removal"	4) "not sure what you mean"	
5) "It would be GREAT if catheters would stop bypassing."					5) "Maybe in the future"	
6) "larger islets."					6) "I don't know how you could change the design"	
7)"bigger islets, a design to prevent blocking"					7) "don't know what way tho"	
8) "Frequent blockages due to position of catheter in bladder, Frequent changes due to by passing as eyelets are so small and block easily, debris build up cant pass through most catheter tips"					8) "Most patients are happy with the design"	
9) "Improvements need to be made to the design because most community "call outs" relate to catheters bypassing or blocking"					9) "no idea what the answer is"	
10) "Better valves, often change catheters due to being blocked with sediment."					10) "its perfectly functional"	
11) "regular blockages, a redesign may help this"					11) "unsure"	
12) "they bypass very easily"					12) "I cant really think of anything to aid problems with catheters"	
13) "make them less prone to blocking?"					13) "There have been no changes to catheters since first invented"	
					14) "I don't feel knowledgeable enough to answer."	
					15) "I think there must be but not sure what?"	
					16) "Not sure what to suggest."	
					17) "If there could, there would?"	
					18) "I have not came across any problems with the design so far and unsure of what improvement could be made".	
					19) "I have no idea how to design a catheter"	

Appendix 8

Patient suggestions for catheter design innovation

Night time issues	Material issues	Tubing length	Discrete	Catheter bag	Straps	Connection and valve issues	Water proof design	Endurance	Other
1) "If something could hold open the catheter bag at night time to prevent bypassing due to the bag being squished during sleep."	*1) "The stocking often makes the inner thigh very uncomfortable. I often just holdsthe bag on something else to stop the irritation. So a new stocking design would be good."*	*1) "The tubing of the catheter could be shorter."*	*1) "Would be better if the catheter was more discrete. Prefer the short catheter bags to the long ones"*	*1) "Stocking and bag could be made longer and bigger. This would allow for the more liquid to be stored so it needed to be emptied less ie. would be useful on long journeys. Then keep the option of the usual smaller bag for around the house and daily life."*	*1) "The straps could be improved to prevent awkward twisting, "*	*1) "If there was some sort of lock to prevent the bag's flip opening if it gets knocked. "*	*1) "If there could be some sort of shower proof design ie. straps would be waterproof. Something to hold the catheter tube while in the shower"*	*1) "If possible if some sort of the catheter could stay in longer that would be ideal so that there needed to be less processes."*	*1) "Creating a tug-proof catheter for Alzheimers"*
2) "The night bag would be better if the tubing branched off of the thigh rather than the calf, as I feel this would reduce the degree at which the tubing of the catheter interferes when turning over and changing positions during the night."	*2) "The straps currently give me bad sores, so an improvement to the straps would-be good. A softer material for the tubing of the catheter"*	*2) "Longer tubing for more overweight people."*	*2) "More discrete design so he can comfortably wear a kilt"*	*2) "Would prefer the catheter bag to be larger so that it would hold more urine so that it wouldn't have to be emptied as often"*	*from the valves being knocked by clothing etc."*	*2) "Should create a lock system on the valves to prevent accidental leakages from the valves being knocked by*	*2) "Would be good if there was some sort of lasting the shower"*	*2) "catheters are't full 12 weeks because the quality of the product is poor."*	*2) "Make the perforations of the hole for where the leg straps go through easier to break."*
3) "a better emptying system for the overnight bag could be created: ie. a bypassing and leaking. I feel the valve rather than the current cutting system"	*3) "The straights holding up the catheter bag are very itchy."*	*3) "Less dangly things such as bags and valves."*	*3) "The catheter bags are too fragile and rip."*	*4) "The current long catheter bag attachment is too long, and the short catheter bag is too short. A middle length catheter bag of approximately 20cm would be ideal."*		*3) "I feel there could be stronger connections between the catheter and the catheter bag because they sometimes come apart very easily. The joining section doesn't always seen particularly compatible."*			*3) "Suprapubic is much better due to being more discrete, more hygienic and more dignified."*
4) "The night stand is very flimsy."	*4) "The quality of material of the catheter from the manufacturer is poor. If the quality of catheters were better it may stop rejection, quality of the catheter has reduced over the years."*	*4) "Would prefer a more discrete design"*	*5) "Would like multiple smaller catheter bags instead of one large catheter bag. This would improve her body image due to the urine collection method being more discrete and allowing her to wear tighter trousers."*			*4) "The connections between catheter and catheter bags often too loose or too tight"*			*4) T"he catheter is fine, it is the 'accessories' that are the problem."*
	5)"Make the straps out of a more comfortable material."					*5) "The design is not secure. If the silicone gets hot the catheter and catheter bag don't fit together and they come apart. The flipflop valve tends to be very flimsy. Valves could maybe more like a screw or top."*			